

APPLICATION FOR UNITED STATES LETTERS PATENT

FOR

METHOD AND APPARATUS

FOR

PROVIDING A LOCATION BASED APPLIANCE PERSONALITY

Inventor: Vaughn S. Iverson

Prepared by:

BLAKELY SOKOLOFF TAYLOR & ZAFMAN, LLP
12400 Wilshire Boulevard, 7th Floor
Los Angeles, California 90025
(503) 684-6200

"Express Mail" label number EL034430812US

"Express Mail" mailing label number EL034430812US
Date of Deposit February 1, 1999

I hereby certify that I am causing this paper or fee to be deposited with the United States Postal Service "Express Mail Post Office to Addressee" service on the date indicated above and that this paper or fee has been addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Michelle D. Grant
Signature

2/1/99
Date

**METHOD AND APPARATUS FOR
PROVIDING A LOCATION BASED APPLIANCE PERSONALITY**

5 BACKGROUND OF THE INVENTION

1. Field of the Invention

 The present invention relates to the field of electronic devices and, in particular, to a method and apparatus for enabling electronic devices to modify their user interface, application
10 set and, therefore, their perceived functionality based, at least in part, on the location of the electronic device.

2. Background Information

 The evolution of electronic devices continues at an ever increasing rate. Indeed,
15 electronic devices have infiltrated many areas of every day life to the point where they are commonly thought of as household or office “appliances” as we become ever more deeply entrenched in the electronic age. Examples of this evolution abound as electronic organizers have all but replaced paper-based calendars and organizers; pagers and cellular phones have released us from the bond of wireline telephone systems; substantially instantaneous
20 communication via electronic mail has supplanted its slower postal service counterpart; and the global communications network colloquially referred to as the Internet has opened the libraries of the world to anyone with a computer (in any of its many forms) and a modem.

 In the continuing effort to improve the usability of such electronic appliances which they produce, manufacturers have focused on the form factor, e.g., size, of the appliance. That is, the

effort expended by manufacturers of electronic appliances has been to reduce the size of the electronic appliance, its power consumption, and the heat generated by the appliance to make it more portable for today's highly mobile users. The size of, for example, notebook computers, personal digital assistants (PDA's), personal communication systems (PCS) handsets, pagers and
5 personal navigation systems (e.g., utilizing satellite-based global positioning system (GPS) technology) have all been reduced to make them easier to fit into a briefcase, a backpack or a shirt pocket.

Although the reduced size of these appliances has, indeed, made them more appealing to the masses, many consumers have realized that these smaller devices are merely a reflection of
10 their larger ancestors. That is, the smaller electronic appliances provide the same information and application set using the same user interface as their larger counterpart. For example, the user of a computer system will typically utilize the same operating system rendering the same user interface irregardless of whether the computer is being used in the home or office.

Those skilled in the art have begun to realize that users of electronic appliances often
15 have different electronic appliance needs depending upon where it is being used. For example, someone using the appliance at work will need ready access to work files, phone directories and the like, whereas a home user of the device may need ready access to home finances, games and educational applications, personal phone directories and the like. A salesman, using the appliance on a business trip may well have a different and unique set of needs altogether,
20 requiring the device to be utilized as a pager, facsimile machine or any of a host of other applications. Although the users of such devices in these alternate locations may, in fact, have

quite different interests and, consequently, entirely different sets of needs, the developers of such systems have heretofore disregarded this need, relegating such users to buy a plethora of dedicated electronic appliances to satisfy these individual needs.

Some devices have been developed which provide unique information to a system user on the basis of time and/or date. Personal Digital Assistant's (PDA's) such as the Palm Pilot™, by 3COM, Corporation of Santa Clara, California, offers a time planner application which will alert a user when it is time for a pre-scheduled event, manually programmed by the system user.

Analogously, Global Positioning Systems (GPS) navigation systems provide location based information to a user. However, each of the foregoing are dedicated appliances, incapable of automatically adjusting their user interface and perceived functionality, i.e., their personality based on location or user.

Thus a need exists for a method and apparatus for providing a location based appliance personality, unencumbered by the deficiencies and limitations commonly associated with the prior art.

In accordance with the teachings of the present invention, a method and apparatus for providing a user interface and information control is described. In accordance with one embodiment of the present invention, a method for providing an appliance personality is presented comprising ascertaining a current location/location type for the electronic appliance, selecting a suitable electronic appliance personality based, at least in part, on the ascertained location/location type of the electronic appliance and provisioning the selected appliance personality on the electronic appliance.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will be described by way of exemplary embodiments, but not limitations, illustrated in the accompanying drawings in which like references denote similar elements, and in which:

5 **Figure 1** is a block diagram illustration of an example electronic appliance incorporating the teachings of the present invention;

Figure 2 is a flow chart illustrating an example method for altering the personality of an electronic appliance based, at least in part, on the location of the appliance, in accordance with one embodiment of the present invention;

10 **Figure 3** is a graphical illustration of an example personality database, in accordance with one embodiment of the present invention;

Figure 4 is a graphical illustration of an example characteristics database, in accordance with one embodiment of the present invention;

15 **Figures 5 and 6** each provide a graphical illustration of example user interfaces for alternate device personalities provisioned by an electronic appliance incorporating the teachings of the present invention, in accordance with one embodiment of the present invention;

Figure 7 is a block diagram of an example electronic appliance incorporating the teachings of the present invention, in accordance with an alternate embodiment of the present invention; and

20 **Figure 8** is a block diagram of an example software architecture for an electronic appliance incorporating the teachings of the present invention, in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

In the following description, for purposes of explanation, specific numbers, materials and configurations are set forth in order to provide a thorough understanding of the present invention.

5 However, it will be apparent to one skilled in the art that the present invention may be practiced without the specific details. In other instances, well known features are omitted or simplified in order not to obscure the present invention. Furthermore, for ease of understanding, certain method steps are delineated as separate blocks, however, those skilled in the art will appreciate that such separately delineated blocks should not be construed as necessarily conferring an order
10 dependency in their performance.

Reference in the specification to “one embodiment” or “an embodiment” means that a particular feature, structure or characteristic described in connection with the embodiment is included in at least one embodiment of the present invention. Thus, the appearances of the phrase
15 “in one embodiment” appearing in various places throughout the specification are not necessarily all referring to the same embodiment.

Referring now to **Figure 1**, a block diagram of an example embodiment of an electronic appliance which, in accordance with the teachings of the present invention, adjusts the appliance personality (e.g., user interface and application set) and, therefore, the perceived functionality of the electronic appliance based, at least in part, on an identified current location and/or location
20 type of the electronic appliance appliance. In accordance with the example embodiment of **Figure 1**, electronic appliance **100** beneficially includes receiver **104** which receives, downconverts and demodulates signals from any of a number of alternate sources (i.e., signal providers), to extract

information from which controller **102** calculates a current location/location type of electronic appliance **100**. Based, at least in part, on the identified location/location type of electronic appliance **100**, controller **102** (re)configures the user interface and the application set provisioned on the electronic appliance **100** with an appropriate one of a plurality of available appliance

5 “personalities”. As used herein, an application set refers to the set of functions/applications available on a typical dedicated electronic device, e.g., a PDA, a cellular telephone, a pager, a personal/portable/notebook computer, and the like. Thus, in accordance with the teachings of the present invention, to be developed more fully below, electronic appliance **100** modifies its appliance personality, and therefore to its perceived functionality, to any of a number of available

10 personalities based, at least in part, on the current location/location type of the electronic appliance. Accordingly, unlike the common prior art electronic devices with a single, dedicated personality, an electronic appliance incorporating the teachings of the present invention has a plurality of such personalities and automatically alters its personality based, at least in part, on the determined location of the electronic appliance.

15 In one embodiment, for example, electronic appliance **100** incorporating the teachings of the present invention may well take on the personality (e.g., user interface and application set) of a personal digital assistant (PDA) in a first location (e.g., the office), and the personality of a GPS when the appliance is moved to a second location (e.g., a national forest), or while the appliance is mobile. Those skilled in the art will appreciate, from the description to follow, that an electronic

20 appliance incorporating the teachings of the present invention represents a new paradigm in consumer electronics, wherein the electronic appliance tailors its perceived functionality to

accommodate the many needs of a typical consumer heretofore requiring a plurality of dedicated electronic appliances.

In addition to those elements enumerated above, electronic appliance **100** is shown comprising user input/output (I/O) interface **106**, memory/storage device **108**, video interface device **110** and audio interface device **112**, coupled together as depicted. As will be described in greater detail below, receiver **104** continuously receives signals from any of a number of alternate sources, e.g., signal providers, providing a signal from which controller **102** calculates the current location information of appliance **100**. In one embodiment, for example, receiver **104** is a global positioning system (GPS) receiver, which receives and downconverts signals from any of a number of alternative GPS satellites in orbit around the earth into a form that is recognizable by controller **102**. In another embodiment, receiver **104** is a Long Range Navigation (LORAN) receiver, which receives and downconverts signals from terrestrial LORAN transmitters at known locations. In yet another embodiment, receiver **104** is an Infra Red (IR) receiver, which receives and downconverts signals from an IR transmitter. In each of these embodiments, the received signals contain, among other things, information regarding the location of the transmitter and the time the signal was sent. Based, at least in part, on the information contained in, or associated with the received signal, controller **102** calculates the relative location of appliance **100**. In one embodiment, receiver **104** receives such signals from a communicatively coupled antenna (not shown). In one embodiment, the antenna is incorporated into the housing of electronic appliance **100**. In one embodiment, the antenna is a photovoltaic cell to receive IR signals.

In addition to receiving location information as described above, receiver **104** also receives communication signals, in certain embodiments. In one embodiment, for example, receiver **104** also receives select ones of cellular telephony, personal communications system (PCS), pager signals, television signals, high-definition television signals, satellite

5 communication signals, and the like. In one embodiment, electronic appliance **100** also comprises a communications transmitter (not shown) enabling electronic appliance **100** to assume the personality of, for example, a wireless telephone adhering to any of a number of alternative wireless telephony and personal communication system standards. In one embodiment, receiver **104** is intended to represent a hybrid combination of two or more types of
10 receivers, thereby providing multiple function capability. Those skilled in the art will appreciate that the general operation of each of such receivers is well known and, thus, they need not be further discussed here.

As indicated above, receiver **104** provides the received and downconverted signal to controller **102** which, as will be described more fully below, utilizes the received information to
15 determine the location of the appliance. In one embodiment, for example, controller **102** determines the relative location of the appliance in relation to the transmitter(s) from which the signals were received. In an alternate embodiment, controller **102** determines the exact geographical location of the appliance, from which a user interface is determined and an appropriate personality is identified. As used herein, controller **102** may well be any of a number
20 of alternate devices known in the art such as, but not limited to a processor, an application

specific integrated circuit (ASIC), a programmable logic device (PLD), a programmable logic array (PLA), a special purpose controller, a microprocessor, a microcontroller, and the like.

In addition to determining the location of the electronic appliance, controller **102** controls the provision of user input device **106**, video interface device **110** and audio interface device **112**.

5 More specifically, controller **102** controls the provision and perceived functionality of a user interface as presented to the user via user input device **106**, video interface device **110** and audio interface device **112**. In one embodiment, for example, user interface **106** interfaces with a keyboard (not shown) through which a user enters commands and/or data to electronic appliance **100**. In an alternate embodiment, video interface device **110** has "touch screen" capability, and
10 user interface **106** interfaces with video interface device **110** to recognize and receive user input via the touch screen. In yet another embodiment, appliance **100** responds to voice commands from an embedded microphone (not shown). Thus, those skilled in the art will appreciate that any of a number of I/O devices may be used to provide an acceptable user interface that complements the selected personality of electronic appliance **100**.

15 As used herein, video interface device **110** and audio interface device **112** are intended to represent any of a number of alternative video interface devices and audio interface devices known in the art. In one embodiment, for example, video interface device **110** utilizes liquid crystal display (LCD) technology to display information to a user of the appliance. In an alternate embodiment, video interface device **110** utilizes plasma display technology to display
20 information to a user. In one embodiment, audio interface device **112** utilizes stereo speaker technology in cooperation with a microphone to enable an audio user interface.

Memory/storage device **108** is similarly intended to represent any of a number of memory/storage devices known in the art. In one embodiment, for example, memory/storage device **108** is a mass storage hard drive. In an alternate embodiment, memory/storage device **108** is a re-writable optical drive. Accordingly, those skilled in the art will appreciate that such elements may well take many forms without deviating from the spirit and scope of the present invention and, thus, need not be further described herein.

Having introduced the architectural elements of an example electronic appliance **100** incorporating the teachings of the present invention with reference to **Figure 1**, an example method of operation of electronic appliance **100** will be developed more fully with reference to the flow chart of **Figure 2**. More specifically, **Figure 2** illustrates a flow chart of an example method for altering the personality of an electronic appliance based, at least in part, on the location/location type of the appliance, in accordance with one embodiment of the present invention. For ease of explanation, and not limitation, the method of **Figure 2** will be developed with continued reference to the electronic appliance of **Figure 1**.

Turning to **Figure 2**, an example method for altering the personality of an electronic appliance is presented, in accordance with one embodiment of the present invention. In accordance with the illustrated example embodiment of **Figure 2**, the method begins at block **202**, wherein appliance **100** receives one or more signals containing information from which a location and/or location type of the appliance can be determined. In one embodiment, for example, the signal(s) is(are) detected by an antenna (not shown) and passed to receiver **104**, wherein the received signals are filtered, downconverted and demodulated to extract the

information from the received signal, as described above. More specifically, in accordance with one embodiment of the present invention, receiver **104** processes the received signal to extract time and location information embedded within the signal denoting when the signal was transmitted. In one embodiment, the location information is a transmitter identifier.

5 The information obtained from the received signal, along with a timestamp of when the signal was received, is provided to controller **102** which determines the location or location type of appliance **100** based, at least in part, on the information contained in the received signals, block **204**. In one embodiment, for example, controller **102** calculates the difference between when the signal was first transmitted and when it was received to determine how far away
10 appliance **100** is from the identified signal source. In one embodiment, controller **102** relies on informational signals received from two or more sources to accurately determine the position of appliance **100**, while in an alternate embodiment, a single detailed informational signal may suffice. In one embodiment, for example, controller **102** accesses a location database resident within memory/storage device **108** to identify a particular location based, at least in part, on the
15 relative location calculated from the received signals. In an alternate embodiment, controller **102** accesses a location database within memory/storage device **108** to identify a location type (e.g., hotel, forested region, ballpark, etc) from information embedded within the received signal(s). An example of just such a location database is provide with reference to **Figure 3**.

 Turning briefly to **Figure 3**, a graphical illustration of an example location database is
20 presented, in accordance with one embodiment of the present invention. In accordance with the illustrated example embodiment of **Figure 3**, location database **300** is shown comprising a

location type field **302**, time delay field **304**, signal identification (ID) field **306**, latitude field **308**, longitude field **310**, elevation field **312**, infra-red (IR) identifier **314**, rate of change field **316**, and the default personality field **318**. As shown, location database **300** is a two-dimensional database correlating location information along the x-axis with location identifiers of particular locations or operating environments along the y-axis. Those skilled in the art will appreciate, however, that location database **300** is but an example and that databases of greater or lesser complexity could well be substituted for location database **300**. For example, a three dimensional database may well be used wherein the z-axis is comprised of interface characteristics associated with each of the default personalities listed in default personality field **318**.

With continued reference to **Figure 3**, location database **300** denotes particular location types and/or operating environments along the y-axis, e.g., home **320**, office **322**, mobile **324** and airplane **326**, to name a few. Along the x-axis in columns **304-316** are stored location information correlated to the particular location type and/or operating environment. For example, if appliance **100** receives a LORAN signal from a transmitter with signal ID **3128**, experiencing a time delay of 3ms, that is but one indication that the appliance is located within the “home” of the user of the device. Further information from, say, an IR transmitter (IR identifier field **314**), or a global positioning system (GPS) (e.g., with reference to fields **308-312**) enables appliance **100** to further define the location within the home to the kitchen or study, for example. The office location is defined with signals from multiple LORAN transmitters (e.g.,

fields **304** and **306**, as well as a global positioning system (GPS) which provides elevation information as well, e.g., as denoted in elevation field **312**.

In accordance with the teachings of the present invention, field **318** denotes a default appliance personality associated with each of the location ID's located in column **302**. In one embodiment, a first alternate appliance personality may be denoted in parenthesis (). In one embodiment, the default personality denoted in column **318** associated with a particular location ID **302** is defined by the user of the appliance with a set-up application. In an alternate embodiment, appliance **100** includes instructions enabling appliance **100** to determine the general operating environment and automatically select a default appliance personality suitable to the identified operating environment. Those skilled in the art will appreciate that the default personality is merely a starting point, the user of appliance **100** can change the dynamically selected personality by selecting an alternate personality. In one embodiment, the user of appliance **100** can alter the user interface and/or application set associated with a personality, thereby further customizing the perceived functionality of appliance **100**. In one embodiment, to be described more fully below, electronic appliance **100** depicts an icon associated with a pull-down table of personalities from which the user of appliance **100** may select a suitable appliance personality, adjust the user interface, and/or select/modify the provisioned application set.

In addition to the location database depicted in **Figure 3**, electronic appliance **100** may also access other, remote location databases such as, for example, the MapBlast™ web site. Those skilled in the art will appreciate that the MapBlast™ web site enables a user to enter an address, or other geographical coordinates, to identify a particular location. Accordingly,

appliance **100** can access such remote location databases to identify the location type/operating environment of the appliance in order to select an appropriate one of a plurality of alternative appliance personalities. Moreover, in one embodiment, when such remote databases are accessed, a select subset or all of the location information available in the remote database is automatically downloaded to the local location database, e.g., location database **300**, to reduce the need for further accesses to remote location databases in the future.

Returning to **Figure 2**, having determined a location or location type of electronic appliance **100** based, at least in part, on the information extracted from the received signals in block **204**, controller **102** identifies an appropriate appliance personality from a plurality of available personalities, block **206**. In one embodiment, controller **102** selects user interface characteristics and an application set offering the perceived functionality to provision one of a plurality of available appliance personalities. In one embodiment, for example, controller **102** accesses memory/storage device **108** which has stored therein an interface characteristics/application set database, which correlates a number of interface characteristics and application sets with location types/operating environments and/or appliance personalities. An example of just such an interface characteristics database is presented with reference to **Figure 4**.

Turning briefly to **Figure 4**, an interface characteristics database **400** incorporating the teachings of the present invention is presented, in accordance with one embodiment of the present invention. As shown, interface characteristics database **400** is depicted as a two-dimensional database, with a number of interface characteristics denoted along the y-axis, and a number of alternate location types/operating environments correlated along the x-axis. As with

the location database presented in **Figure 3**, those skilled in the art will appreciate that databases of greater or lesser complexity may well be substituted for interface characteristics database **400** without deviating from the spirit or scope of the present invention.

In accordance with the illustrated example embodiment, interface characteristics database **400** is shown comprising interface characteristics field **402**, a home environment type field **404**, a work environment type field **406**, an auto (or mobile) environment type field **408** and an airplane environment type field **410**. As shown, the interface characteristics field **402** may denote such interface features as the background color of the display **401**, whether particular icons are denoted on the screen, e.g., financial files icon **412**, office files icon **414**, and the like, whether the device takes on the personality of a day planner **416**, a radio **418**, a GPS **420**, or any of a plurality of alternative audio/video user interface characteristics and application sets associated with the available appliance personalities.

Returning to **Figure 2**, once controller **102** selects an appropriate appliance personality from the database **400** in block **206**, controller **102** provisions the selected personality on appliance **100**. In one embodiment, for example, appliance **100** may have a default personality of a personal digital assistant such that whenever the appliance is first turned on, or reset, the appliance boots into the PDA personality. However, as appliance **100** receives and processes reference signals, or if it is apparent that the user is not using the features of the PDA, appliance **100** automatically transitions to a personality that corresponds with the identified location of the appliance **100**, block **206**. Further, as long as appliance **100** continues to operate, the process of updating the appliance personality in accordance with its determined location also continues, as

shown. In this way, appliance **100** incorporating the teachings of the present invention automatically adjusts to meet the dynamic demands of ever mobile appliance users.

Having described example architectural elements and operation of the present invention with reference to the example embodiments depicted in **Figures 1** through **4**, **Figures 5** and **6** are presented to provide a couple of example appliance personalities selectively provisioned by innovative electronic appliance **100**, in accordance with the teachings of the present invention. Those skilled in the art will appreciate, from the description to follow, that the appliance personalities presented in **Figures 5** and **6** are intended to represent selected ones of a plurality of user interfaces/appliance personalities available on a single host electronic appliance, the selection based at least in part on the identified location of the host electronic appliance, as described above. Further, those skilled in the art should appreciate that the following examples are merely illustrative of the types of personalities that may be offered by a host electronic appliance. Certainly, other personalities which are dynamically selected based, at least in part, on the identified location of the host electronic appliance are anticipated by the teachings of the present invention.

Turning to **Figure 5**, user interface **600** is presented depicting an appliance personality of a personal digital assistant, in accordance with one embodiment of the present invention. In accordance with the illustrated example embodiment of **Figure 5**, the visual portion of the user interface **600** is rendered on a video display device **601** displaying a number of icons associated with applications specially provisioned based, at least in part, on the location of the host electronic appliance incorporating the teachings of the present invention, e.g., electronic

appliance **100**. As shown, user interface **600** denoting visual interface for the PDA personality includes icons associated with a digital library **602**, financial files **606**, news sites **604**, telephone listings **608**, an electronic mail application **610**, recipes **612**, sports news/sites **614** and a trash can **616**. In addition to the foregoing, user interface **600** includes a pull-down menu icon **603** in the upper left hand corner of display **601**. In accordance with one embodiment of the present invention, a user of the host electronic device can override the automatic selection of appliance personality, selecting an alternate personality from a display all available personalities by selecting icon **603**. Examples of each of the aforementioned applications/links abound and, as such need not be further described here. Those skilled in the art will appreciate that, in addition to the visual aspects of the user interface, certain electronic appliances may well provide audio aspects to the user interface which, by their nature, cannot be depicted in **Figure 5**.

Turning to **Figure 6**, display **601** of a host electronic device is presented depicting an alternative appliance personality of a cellular telephone. As shown, display **601** includes an functioning keypad display **702**, a microphone display icon **706** and a speaker display icon **704**. Those skilled in the art will appreciate that the microphone display icon **706** and the speaker display icon **704** are not a functioning speaker or microphone, but rather are displayed in the general area of where a speaker and microphone are embedded within the electronic appliance, thereby providing a user with the visual queues necessary to position the ear in proximity to the speaker, and the mouth in proximity to the microphone. In accordance with this embodiment of the present invention, display **601** is a touch sensitive screen, enabling a user to interact with the electronic appliance by “pushing” the appropriate “buttons” rendered on display **601**. Thus, in

accordance with the description above, a single electronic device incorporating the teachings of the present invention provisions the PDA personality depicted in **Figure 5** in one location, while provisioning the cellular telephone personality depicted in **Figure 6** at an alternative location, or as selected by a user from pull-down menu **603**.

Turning to **Figure 7**, a block diagram of an example electronic appliance **800** incorporating the teachings of the present invention is depicted, in accordance with an alternate embodiment of the present invention. In accordance with the illustrated example embodiment, electronic appliance **800** is depicted comprising one or more processors **802** with associated cache(s) **806** and host bridges **804** coupling processor(s) **802** to a high speed input/output (I/O) bus **810**. In addition, system memory **808**, video memory **812**, audio/video tuner **828**, network communications interface **830**, bus bridge **816** and user interface controller **832** incorporating the teachings of the present invention are also communicatively coupled to high speed I/O bus **810**, as depicted. In accordance with the teachings of the present invention, user interface controller **832** includes receiver **104** to receive, downconvert and demodulate, signals received from any of a number of transmitting sources to extract information from which user interface controller **832** determines the location of appliance **800**, and to control provision of the user interface characteristics and perceived functionality, in accordance with the teachings of the present invention.

As shown, bus bridge **816** couples high speed I/O bus **810** to another, typically I/O, bus **818**. In accordance with the illustrated example embodiment of **Figure 7**, electronic appliance **800** also includes mass storage device **820**, keyboard **822**, pointing device **824** and I/O ports **826**.

With continued reference to **Figure 7**, elements **802-830** perform their conventional functions as known in the art. In particular, mass storage device **820** is used to provide permanent storage for the data and programming instructions to implement the above described functions, whereas system memory **808** is used to provide temporary storage for the data and programming instructions when executed by processor(s) **802**. In one embodiment, for example, mass storage **820** stores the location and interface databases associated with the teachings of the present invention. I/O ports **826** are one or more serial and/or parallel communication ports used to provide communication between additional peripheral devices which may be coupled to electronic appliance **800**. Network communications interface communicatively couples electronic appliance **800** to other remote devices such as, for example, remote location databases in accordance with the teachings of the present invention. Thus, those skilled in the art will appreciate that, except for the teachings of the present invention, electronic appliance **800** is intended to represent any of a number of alternative well known electronic appliances, including but not limited to general purpose computer systems based on the Pentium® processor, the Pentium® Pro processor, or the Pentium® II processor commonly available from Intel Corporation of Santa Clara, California.

Further, it is to be appreciated that various components of electronic appliance **800** may well be re-arranged, integrated, or practiced with greater or lesser functional blocks without deviating from the spirit and scope of the present invention. For example, the peripheral devices shown coupled to standard I/O bus **818** may, in alternate embodiments, be coupled to high

performance I/O bus **810**; in addition, in some implementations only a single bus may exist with the components of electronic appliance **800** being coupled to the single bus.

In accordance with one aspect of the present invention, the innovative features of the present invention are utilized by software routines run by electronic appliance **800** of **Figure 7**.

5 These software routines run a plurality or series of instructions to be executed by a processor, such as processor(s) **802** and user interface controller **832** in electronic appliance **800**. Initially, the series of instructions are stored on a storage device, such as mass storage device **820**. It is to be appreciated that the series of instruction may be stored on any conventional storage device, such as a diskette, CD ROM, magnetic tape, DVD, laser disk, ROM, flash memory, etc. It is
10 also to be appreciated that the series of instruction need not be stored locally, and could be received from a remote storage device, such as a server on a network, via I/O ports **826**. The instructions are copied from the storage device, such as mass storage device **820**, into system memory **814** and then accessed and executed by processor(s) **802**. In alternate embodiments, the functional routines used to implement the teachings of the present invention are implemented in
15 discrete hardware or firmware. For example, an application specific integrated circuit (ASIC) could be programmed with the above described functions of the present invention.

Turning to **Figure 8**, a block diagram of an example software architecture implemented on an electronic appliance incorporating the teachings of the present invention is presented, in accordance with one embodiment of the present invention. In accordance with the illustrated
20 example embodiment of **Figure 8**, software architecture **900** is shown comprising a plurality of applications **910**, operating system and device drivers **912** (depicted as one functional block for

ease of explanation), and user interface manager **902** incorporating the teachings of the present invention, cooperatively coupled as depicted. Those skilled in the art will appreciate, from the description to follow, that user interface manager **902** includes services for controlling the provision of the user interface and perceived functionality of a host electronic appliance based, at least in part, on received reference signals **903** in accordance with the teachings of the present invention.

In accordance with the illustrated example embodiment of **Figure 8**, user interface manager **902** is shown comprising application manager services **904**, interface selection services **906** and location identification services **908**. As used herein, location identification services **908** determines the location of a host electronic appliance, e.g., electronic appliance **100** or **800**, based at least in part on reference signals **903** received from external sources, as described above. In one embodiment, location identification services **908** are a plurality of executable instructions which, when executed by an appropriate processor/controller, implement the method of **Figure 2** to determine the location of the host electronic appliance. In accordance with one embodiment of the present invention, location identification services **908** accesses location database via the operating system/device drivers **912** to identify a location type/operating environment stored therein which corresponds to the information extracted from the received reference signals **903**. As described above, however, location identification services may well access remote sources of location identification information via the networking/communication services of operating system/device drivers **912**.

Interface selection services **906** control the provision of the user interface of a host electronic appliance based, at least in part, on the location of the appliance as determined by location identification services **908**. In accordance with the illustrated example embodiment, interface selection services **906** accesses the interface characteristics database **914** to select appropriate interface characteristics based, at least in part, on the determined location of the host electronic appliance. In one embodiment, for example, interface selection services **906** control the personality of a host electronic appliance through provision of the user interface represented by select ones of applications **910** and operating system/device drivers **912**, as described above.

With continued reference to **Figure 8**, application manager services **904** control the provision of and user interface for applications(s) **910** based, at least in part, on the location of the host electronic appliance as determined by location identification services **908**. In one embodiment, for example, the personality of the host electronic device is determined by the user interface selected by interface selection services **906** and the selective provision of one or more applications **910** by application manager services **904** based on the determined location of the host electronic appliance.

As depicted herein, applications **910** are intended to represent any of a number of specialty applications known in the art which are executable by electronic appliances. Similarly, operating system/device drivers **912** is also intended to represent any of a number of alternative general operating systems and device drivers known in the art. Those skilled in the art will appreciate that the execution of operating system **912** is initiated from within a basic input/output system (BIOS) (not shown). Operating system **912** is a general software service which provides

an interface between user interface manager 902, application(s) 910 and hardware elements of the host electronic appliance such as, for example, location database 916 and interface characteristics database 914, as depicted. Operating system 912 also provides an interface, such as a graphical user interface (GUI), between the user and the host electronic appliance.

5 According to one embodiment of the present invention, operating system 912 is the Windows™ 95 operating system, available from Microsoft Corporation of Redmond, Washington. However, it is to be appreciated that the present invention may be used with any other conventional operating system, such as other versions of Microsoft Windows™ (for example, Windows™ 3.0, Windows™ 3.1, Windows™ NT, or Windows™ CE), Microsoft DOS, OS/2, available from
10 International Business Machines Corporation of Armonk, New York, the Apple Macintosh Operating System, available from Apple Computer Incorporated of Cupertino, California, the NeXTSTEP® operating system available from Apple Computer Incorporated, the UNIX operating system, available from Santa Cruz Operations of Santa Cruz, California, the Be operating system from Be, Inc. of Menlo Park, California, and the LINUX operating system.

15 Those skilled in the art will appreciate, based on the foregoing, that an electronic appliance incorporating the teachings of the present invention is also revolutionary in the ability to accommodate any of a number of mental and/or physical challenges encountered by members of our communities. That is, an electronic appliance incorporating the teachings of the present invention provides the inherent ability to tailor the user interface and device personality to
20 present an audio user interface instead of a visual one to accommodate the visually impaired, or a visual interface in lieu of an audio interface to accommodate the hearing impaired. In alternate

embodiments, an electronic appliance incorporating the teachings of the present invention can provide a french-english dictionary to a student in french class, while automatically assuming the personality of a scientific calculator in a math class if such class rooms are equipped with a transmitter providing information regarding the location and course. Thus, those skilled in the art will appreciate that numerous alternate embodiments and implementations of the present invention can be achieved without deviating from the spirit and scope of the present invention.

Thus, alternative embodiments for a method and apparatus facilitating the management of networked devices have been disclosed. While the method and apparatus of the present invention has been described in terms of the above illustrated embodiments, those skilled in the art will recognize that the invention is not limited to the embodiments described. Thus, those skilled in the art will appreciate that the present invention can be practiced with modification and alteration within the spirit and scope of the appended claims. Accordingly, the descriptions thereof are to be regarded as illustrative instead of restrictive on the present invention.